



NEW JERSEY FFA

CAREER AND LEADERSHIP
DEVELOPMENT EVENTS

Forestry

2021

Purpose

The New Jersey FFA Forestry Career Development Event is designed to stimulate student interest and to promote the forestry industry as a career choice. It also provides recognition for those who have demonstrated skills and competencies as a result of forestry instruction in the agricultural education classroom.

Objectives

This event will provide the participant with the ability to:

- Understand and use forestry terms
- Promote an understanding of the economic impact of the forest environment and the forest industry to the American economy
- Recognize environmental and social factors affecting the management of forests
- Identify major species of trees of economic importance to the United States and internationally
- Identify hand tools and equipment in forestry management
- Recognize and understand approved silvicultural practices in the United States
- Identify forest disorders
- Recognize safety practices in forest management

Event Rules

- Teams will consist of four members.
- Team ranking is determined by combining the scores of all team participants.
- This event will be held rain or shine.
- Travel Official Dress is required during the event.
- Under no circumstances will any participant be allowed to touch or handle plant materials or other specimen during event except as specified in certain practicums.
- Each participant must have a clipboard, at least two No. 2 pencils and a calculator.
- Participants are NOT allowed to use (or have visible) electronic devices during the event, unless for medical reasons or a portion of the event requires usage. This includes cell phones, iPods, mp3 players, etc. Participants will be allowed to use calculators, if specified for that event; however, cell phone calculators and graphing calculators are not permitted! Failure to adhere to these rules will result in disqualification.
- All individuals participating will judge in a cooperative manner following the rules set forth by the event coordinator.

Event Format

EQUIPMENT

Materials to be provided by the student:

- Calculator (calculators with programmable abilities are not permitted)
- Computer

Participants are not to bring:

- Cell phones or other electronic devices

FLOW OF EVENT

- **Forestry General Knowledge Exam** – 30 minutes
- **Tree Identification*** – 30 minutes
- **Tree Measurement*** – 30 minutes
- **Practicum 1** – 30 minutes
- **Practicum 2** – 30 minutes

INDIVIDUAL ACTIVITIES

The Forestry Career Development Event will have five components:

Forestry General Knowledge Exam (100 points)

- 30 minutes, 50 questions
- Fifty (50) multiple-choice questions will be selected from areas of the forestry industry reflected in the event objectives. This phase of the event will test the participant's knowledge and understanding of basic principles of forestry.
- Scoring: Each answer has a value of 2 points for a total maximum score of 100 points.

Tree Identification (100 points)

- 30 minutes, 20 specimens
- Twenty live specimens, pressed samples, fresh leaf samples and/or standing trees, from the tree identification specimen list will be displayed for participants to identify by common names.
- Scoring: Five points will be given for each specimen that is correctly identified for a maximum of 100 points.

Tree Measurement (100 points)

- 30 minutes, 10 specimens
- Each participant will measure ten pre-numbered trees on a plot for board foot volume. The participant must record the DBH (Diameter Breast Height) to the nearest one-inch class and the merchantable height of each tree height rounded down to the nearest ½ log.
- Volume tables will be provided at the event.
- The following minimum diameters and log length will be:

Minimum Saw Timber	
DBH	10 inches
Top Diameter	10 inches DIB
Height	16 feet

- Merchantable height stops are estimated to the upper point on a tree where it becomes 10 inches in diameter or where a major fork in a tree stem occurs or where a limb has a diameter equal to ½ of the diameter of the tree at that point.
- Scoring: Thirty points will be given for the correct DBH and thirty points for the correct height. Forty points will be given for the correct volume per acre. Five points will be deducted for each five percent deviation (plus or minus) from the correct measured volume.

Individual Practicums - TWO (2) practicums will be chosen from the list below and announced on the morning of the event. – 30 MINUTES EACH

- **Forest Management Evaluation*** (100 points)
 - 30 minutes, 1 prompt
 - An area will be selected and identified by ribbons, paint, rope, etc. It will contain 20 marked trees within a timber stand. All trees in the selected area will be considered as a forest management site, and the participants will score each marked tree using one of the following options:
 - Harvest —utilize the tree.
 - Leave —the tree should remain in stand for a good reason.
 - Deaden —Undesirable tree, not merchantable or beneficial to wildlife, should be deadened or cut down and left in woods.
 - The participants will be given a situation concerning the forest management objectives of the stand selected. This information will be given to participants at the site before they start. Information that will be needed to help participants in their decisions will include the following: Markets available, wildlife considerations, present condition of stand and management plan.
- **Equipment Identification*** (100 points)
 - 30 minutes, 25 items
 - Twenty-five (25) pieces of equipment from the list will be pictured for participants to identify by technical names. Each piece of equipment will be designated by number.
 - The equipment will be presented in one or more of the following forms: actual samples, pictures or slides and written description.
 - Scoring: Four points will be given for each piece of equipment identified correctly for a total of 100 points.
- **Map Interpretation** (100 points)
 - 30 minutes, 1 prompt
 - Participants will answer questions using a furnished United States Geological Survey topographic map. The participant should know legal description, recognize topographic map symbols, and understand the meaning of map symbols, size and location of 40 acres or more in a parcel.
 - Examples:
 - What is the legal description of the boxed area?
 - What is the item located at this point?
 - What is the acreage of the area enclosed?
 - In what section is the city of Marshall located?
 - What is the elevation at this point?
 - Legal descriptions will be written or described according to the public land survey system.
 - Example: SE ¼ of NW ¼ of Section 3, T3N, R1E

- **Compass Use*** (100 points)
 - 30 minutes, 10 data points
 - The participant will use a hand compass and pacing to the nearest full foot to simulate the determination of the property lines on a tract of timber. The participant will start at any point and record the compass reading and distance to the next point. Azimuth readings shall be recorded. Participants will record data for 10 points.
 - Scoring: Partial credit will be given with a deduction of one point for each two degrees or two feet the participant is off the correct answer.
- **Chainsaw Part Identification, Trouble Shooting and Safety*** (100 points)
 - 30 minutes, 10 questions (may include ID photos and/or multiple-choice questions)
 - This practicum will consist of one or more of the parts below. Parts may utilize photos, video, demonstration, actual parts, written situations and/or problems. This is not an all-inclusive list.
 - Chainsaw parts identification- Each participant will identify parts of a chainsaw.
 - Troubleshooting - The participant will identify chainsaw problems or troubles.
 - Safety - The participant will identify safety hazards or unsafe practices.
 - Scoring: 10 points will be given for each question answered correctly for a total of 100 points.
- **Tree/Forest Disorders*** (100 points)
 - 30 minutes, 20 disorders from actual samples, pictures/slides, written description and written case histories
 - Symptoms of 20 disorders from the Tree Disorders Identification list will be displayed for participants to identify by common names.
 - Scoring: Five points will be given for each tree/forest disorder identified correctly for a total of 100 points.
- **Forest Products*** (100 points)
 - 30 minutes, 20 samples
 - Wood products/samples will be displayed for participants to evaluate and identify its tree species source from the tree identification specimen list. The wood products/samples will be presented in one or more of the following forms: actual sample, pictures/slides, and written description.
 - Scoring: Five points will be given for each wood product/sample identified correctly for a total of 100 points.
- **Forest Business Management Problem** (100 points)
 - 30 minutes, 10 questions
 - This section is designed to determine the participant's ability to apply economic principles and concepts of management to the decision-making process by actual problem analysis and to defend the decisions made. This will involve a model forest operation with possible calculation on profit/loss, cost of operation, taxes, depreciation, marketing product, stumpage cost, record keeping, etc.
 - Scoring: Ten points will be given for each correct answer for a total of 100 points.

TIEBRAKERS

TEAM

Tiebreakers for teams will be determined by adding together the individual ranking of team members. The team with the lowest score will earn the tiebreak.

INDIVIDUALS

1. Knowledge Exam
2. Timber Cruising
3. Tree Identification
4. Total rotational practicum score

Scoring

Total Possible Individual Points: 500 points

Total Points per Team: 2000 points

(1200 team points are needed to advance to Nationals)

*denotes a hands-on practicum area, individual practicum areas are notated next to the individual event

- **Forestry General Knowledge Exam** – 100 points (2 pts. X 50 = 100 pts.)
- **Tree Identification*** – 100 points (5 pts. X 20 = 100 pts.)
- **Tree Measurement*** – 100 points
- **Practicum 1** – 100 points
- **Practicum 2** – 100 points

Awards

Awards will be presented to individuals and the first team based on their rankings at the CDE awards ceremony at the New Jersey State FFA Convention. Awards are sponsored by the National FFA Foundation and the New Jersey FFA Association.

The 1st place team will represent New Jersey at the National FFA Convention in October (if 60% mastery is met).

Individual

- Overall Medals
 - Medals – Top three individuals
- H.O. Sampson Certificates (hands-on sections ONLY)
 - Certificate – Top five individuals

Team

- Plaque Sponsored by the National FFA Foundation – 1st place

References

This list of references is not intended to be all-inclusive.

- National FFA National Career Development Event Questions and Answers FFA.org
- General Knowledge Exam
 - Introduction to Forestry Science, Burton, Delmar Publications
 - Science of Forestry Management, Kris Irwin, University of Georgia, AAVIM
- Tree Identification
 - Dendrology at Virginia Tech, <http://dendro.cnre.vt.edu/dendrology/main.htm>
 - “FFA Georgia State and National Tree Lists”, available from www.amazon.com
 - W. H. Harlow, E. S. Harrar, and F. M. White. Textbook of Dendrology, current edition. New York, NY: McGraw-Hill Book Company
 - Silvics of North America, Handbook #654, volume one and two, U.S. Forest Service, P. O. Box 2417, 12th and Independence Avenue SW, Waashington, DC 20013.
- Tree Measurement
 - Tree Measurement http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/steelprdb5202838.pdf
- Forest Management
 - Introduction to Forestry Science, Burton, Delmar Publications
 - Science of Forestry Management, Kris Irwin, University of Georgia, AAVIM
- Equipment Identification
 - Current Catalog of Forestry Suppliers, Inc., 205 West Rankin Street, Jackson, MS 39204-039
 - www.husqvarna.com/us/acesories/axes-pruning-saws/
 - www.husqvarna.com/us/forest/accessories/chainsawacesories/#forests_tools
 - www.deere.com/en_US/industry/forestry/forestry.page?
 - www.treestuff.com
- Map Interpretation
 - The U.S. Department of Interior Geological Survey Topographic Map Information and Symbols Key, Map Distribution, U. S. Geological Survey, Box 25286, Federal Center, Denver CO
- Chainsaw Parts and Identification
 - Husqvarna publication, How to Work With a Chainsaw, National FFA website
- Compass
 - http://forest.mtu.edu/classes/fw2051/docs/compass_pace.pdf
- Forest Products
 - www.fpl.fs.fed.us/products/publications/several_pubs.php?grouping_id=100&header_id=p
- Forest Business Management
 - Introduction to Forestry Science, Burton, Delmar Publications
 - Science of Forestry Management, Kris Irwin, University of Georgia, AAVIM

Tree Identification Specimen List

01. Alder, Red (*Alnus rubra*)
02. Ash (*Fraxinus sp.*)
03. Aspen, Bigtooth (*Populus grandidentata*)
04. Aspen, Quaking (*Populus tremuloides*)
05. Baldcypress (*Taxodium distichum*)
06. Beech, American (*Fagus americana*)
07. Birch, Black (*Betula lenta*)
08. Birch, White (*Betula papyrifera*)
09. Cherry, Black (*Prunus serotina*)
10. Cottonwood, Eastern (*Populus deltoides*)
11. Elm (*Ulmus sp.*)
12. Fir, Balsam (*Abies balsamea*)
13. Fir, Douglas (*Pseudotsuga menziesii*)
14. Hemlock, Eastern (*Tsuga canadensis*)
15. Hemlock, Western (*Tsuga heterophylla*)
16. Hickory (*Carya sp.*)
17. Maple, Red (*Acer rubrum*)
18. Maple, Sugar (*Acer saccharum*)
19. Oak, Black (*Quercus velutina*)
20. Oak, Chestnut (*Quercus Montana*)
21. Oak, Northern Red (*Quercus rubra*)
22. Oak, Scarlet (*Quercus coccinea*)
23. Oak, Southern Red (*Quercus falcata*)
24. Oak, White (*Quercus alba*)
25. Pecan (*Carya illinoensis*)
26. Pine, Eastern White (*Pinus strobus*)
27. Pine, Loblolly (*Pinus taeda*)
28. Pine, Lodgepole (*Pinus contorta*)
29. Pine, Longleaf (*Pinus palustris*)
30. Pine, Pitch (*Pinus rigida*)
31. Pine, Ponderosa (*Pinus ponderosa*)
32. Pine, Red (*Pinus resinosa*)
33. Pine, Shortleaf (*Pinus echinata*)
34. Poplar, Yellow (*Liriodendron tulipifera*)
35. Red Cedar, Western (*Thuja plicata*)
36. Redcedar, Eastern (*Juniperus virginiana*)
37. Spruce, Red (*Picea rubens*)
38. Spruce, Sitka (*Picea sitchensis*)
39. Spruce, White (*Picea glauca*)
40. Sweetgum (*Liquidambar styraciflua*)
41. Sycamore (*Platanus sp.*)
42. Walnut, Black (*Juglans nigra*)

Equipment Identification List

- | | |
|--------------------------------|------------------------------|
| 01. Altimeter | 35. Increment Borer |
| 02. Angle guage | 36. Jacob Staff |
| 03. Ascender | 37. Log Rule |
| 04. Automatic Level | 38. Logger's Tape |
| 05. Back-pack Fire Pump | 39. Maul |
| 06. Bark Gauge | 40. Peavy |
| 07. Bulldozer | 41. pH Meter |
| 08. Canthook | 42. Planimeter |
| 09. Carabiner | 43. Plant Press |
| 10. Chainsaw | 44. Plastic Flagging |
| 11. Chainsaw Chaps | 45. Pole saw |
| 12. Clinometer | 46. Pruning Saw |
| 13. Combination tool | 47. Pulaski Axe |
| 14. Data Recorder | 48. Relaskop |
| 15. Densiometer | 49. Safety Glasses |
| 16. Diameter Tape | 50. Safety Hard Hat |
| 17. Dot Grid | 51. Scale Stick |
| 18. Drip Torch | 52. Secchi Disc |
| 19. Ear Protection | 53. Soil Sampler |
| 20. Endloader | 54. Soil Test Kit |
| 21. Feller Buncher | 55. Staff Compass |
| 22. Felling Wedge | 56. Stereoscope |
| 23. Fiberglass Measuring Tape | 57. Tally Book |
| 24. Fire Rake | 58. Tally Meter |
| 25. Fire shelter | 59. Timber Tongs |
| 26. Fire Weather Kit | 60. Tree Caliper |
| 27. Fire-Swatter | 61. Tree Harvester |
| 28. First aid kit | 62. Tree Marking Gun |
| 29. Flow/current Meter | 63. Tree Planting Hoe or Bar |
| 30. GPS Receiver | 64. Tree Skidder |
| 31. Hand Compass | 65. Water Sampler |
| 32. Hand Lens/Field Microscope | 66. Water Test Kit |
| 33. Hip Chain | 67. Wedge Prism |
| 34. Hypo-Hatchet | |

Tree Disorders Identification List

01. Aphid
02. Asian Longhorn Beetle
03. Butt or Heart Rot
04. Canker
05. Chemical damage
06. Cicada
07. Climatic injury: snow, wind, frost, drought, hail
08. Damping off
09. Douglas fir tussock moth
10. Emerald ash borer
11. Fir Engraver Beetle
12. Fire damage
13. Gypsy moth
14. Hemlock woolly adelgid
15. Ips Engraver Beetle
16. Landscape equipment damage
17. Lightning damage
18. Mechanical damage
19. Mistletoe
20. Mountain Pine Beetle
21. Nematode
22. Rust
23. Sawfly
24. Scale
25. Spruce budworm
26. Sunscald
27. Tent caterpillar
28. Wetwood or slime flux
29. Wildlife/Livestock damage



NEW JERSEY FFA

CAREER AND LEADERSHIP
DEVELOPMENT EVENTS

Agricultural, Food and Natural Resources

Content Standards

Measurement Assessed	Where measured in event	Academic Content Standards Addressed
ABS.01.01. Performance Indicator: Apply micro- and macroeconomic principles to plan and manage inputs and outputs in an AFNR business.		
ABS.01.01.01.c. Create strategies to maximize the efficiency of AFNR business inputs and outputs using microeconomic principles.	Forest Business Management Problem Practicum	CCSS.ELA-Literacy.L.9-10.6 CCSS.ELA-LITERACY.L.11-12.6 CCSS.ELA-LITERACY.RST.9-10.4 CCSS.ELA-LITERACY.RST.11-12.4 CCSS.MATH.CONTENT.HSS.ID.C.7 CCSS.MATH.CONTENT.HSS.IC.B.6 Financial Investing: Benchmarks: Grade 12, Statement 9
ABS.01.02. Performance Indicator: Read, interpret, evaluate and write statements of purpose to guide business goals, objectives and resource allocation.		
ABS.01.02.02.c. Evaluate AFNR business goals and objectives, then make revisions based on data and observations.	Forest Business Management Problem Practicum	CCSS.ELA-LITERACY.W.9-10.2 CCSS.ELA-LITERACY.W.11-12.2 CCSS.ELA-LITERACY.W.9-10.9 CCSS.ELA-LITERACY.W.11-12.9 CCSS.ELA-LITERACY.RI.9-10.4 CCSS.ELA-LITERACY.RI.11-12.4
ABS.01.03. Performance Indicator: Devise and apply management skills to organize and run an AFNR business in an efficient, legal and ethical manner.		
ABS.01.03.01.c. Devise strategies to improve the operation of AFNR businesses using management skills.	Forest Business Management Problem Practicum	CCSS.ELA-LITERACY.SL.9-10.6 CCSS.ELA-LITERACY.SL.11-12.6 CCSS.ELA-LITERACY.L.9-10.6 CCSS.ELA-LITERACY.L.11-12.6 CCSS.ELA-LITERACY.RST.9-10.4 CCSS.ELA-LITERACY.RST.11-12.4
ABS.01.03.02.c. Devise management or operational strategies to address and adhere to local, state, federal, international and industry regulations.	Forestry Issues Presentation Team Activity	CCSS.ELA-LITERACY.SL.9-10.6 CCSS.ELA-LITERACY.SL.11-12.6 CCSS.ELA-LITERACY.L.9-10.6 CCSS.ELA-LITERACY.L.11-12.6 CCSS.ELA-LITERACY.RST.9-10.4 CCSS.ELA-LITERACY.RST.11-12.4

Agriculture, Food and Natural Resources Content Standards continued

Measurement Assessed	Where measured in event	Academic Content Standards Addressed
ABS.04.02. Performance Indicator: Develop production and operational plans for an AFNR business.		
ABS.04.02.01.c. Make recommendations to improve operational plans for an AFNR business based on best practices.	Forestry Issues Presentation Team Activity Forest Business Management Problem Practicum	AFNR Career Cluster – Agribusiness Systems Pathway, Statement 3 CCSS.ELA-LITERACY.ELA-W.9-10.2 CCSS.ELA-LITERACY.W.11-12.2 CCSS.ELA-LITERACY.L.9-10.6 CCSS.ELA-LITERACY.L.11-12.6 CCSS.ELA-LITERACY.RST.9-10.4 CCSS.ELA-LITERACY.RST.11-12.4
ABS.05.01. Performance Indicator: Analyze the role of markets, trade, competition and price in relation to an AFNR business sales and marketing plans.		
ABS.05.01.01.c. Evaluate and predict future trends for a specific AFNR product as related to markets, trade and price (e.g., corn, oil, wheat, etc.).	Forestry Issues Presentation Team Activity	AFNR Career Cluster, Statement 7 AFNR Career Cluster – Agribusiness Systems Pathway, Statement 1 Financial Investing: Benchmarks: Grade 12, Statement 13
CS.01.01. Performance Indicator: Examine issues and trends that impact AFNR systems on local, state, national and global levels.		
CS.01.01.01.c. Evaluate and explain AFNR issues and their impacts to audiences with limited AFNR knowledge.	Forestry Issues Presentation Team Activity	
CS.01.01.02.c. Evaluate emerging trends and the opportunities they may create within the AFNR systems.	Forestry Issues Presentation Team Activity	
CS.01.03. Performance Indicator: Identify public policies and their impact on AFNR systems.		
CS.01.03.01.c. Evaluate a public policy within AFNR systems and defend or challenge it.	Forestry Issues Presentation Team Activity	
CS.02.01. Performance Indicator: Research geographic and economic data related to AFNR systems.		
CS.02.01.02.c. Devise a strategy to solve a problem in an AFNR system using a set of economic data.	Forestry Issues Presentation Team Activity	
CS.02.02. Performance Indicator: Examine the components of the AFNR systems and their impact on the local, state, national and global society and economy.		
CS.02.02.01.c. Devise a strategy for explaining components of AFNR systems to audiences with limited knowledge.	Forestry Issues Presentation Team Activity	
CS.02.02.02.c. Evaluate how society traditions, customs or policies have resulted from practices with AFNR systems.	Forestry Issues Presentation Team Activity	
CS.02.02.03.c. Evaluate how positive or negative changes in the local, state, national or global economy impacts AFNR systems.	Forestry Issues Presentation Team Activity	

Agriculture, Food and Natural Resources Content Standards continued

Measurement Assessed	Where measured in event	Academic Content Standards Addressed
CS.03.04. Performance Indicator: Use appropriate protective equipment and demonstrate safe and proper use of AFNR tools and equipment.		
CS.03.04.01.a. Identify and differentiate the appropriate protective equipment for the safe use and operation of specific tools and CS.03.04.02.a. Identify standard tools, equipment and safety procedures related to AFNR tasks.	Chainsaw Part Identification, Troubleshooting and Safety Practicum	
CS.03.04.02.b. Complete the set up and adjustment for tools and equipment related to AFNR tasks.	Chainsaw Part Identification, Troubleshooting and Safety Practicum	
C3.06.04.02.c. Evaluate and select appropriate tools and equipment to complete AFNR tasks.	Chainsaw Part Identification, Troubleshooting and Safety Practicum	
CS.03.04.03.a. Read and interpret operating instructions related to operation, storage and maintenance of tools and equipment related AFNR tasks.	Chainsaw Part Identification, Troubleshooting and Safety Practicum	
CS.03.04.03.b. Assess and demonstrate appropriate operation, storage and maintenance techniques for AFNR tools and equipment.	Chainsaw Part Identification, Troubleshooting and Safety Practicum	
CS.04.01. Performance Indicator: Identify and implement practices to steward natural resources in different AFNR systems.		
CS.04.01.01.b. Analyze available practices to steward natural resources in AFNR systems (e.g., wildlife and land conservation, soil and water practices, ecosystem management, etc.). TSI	Forest Business Management Problem Practicum	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3
CS.04.01.02.b. Analyze and assess sustainability practices that can be applied in AFNR systems (e.g., energy efficiency, recycle/reuse/repurpose, green resources, etc.).	Forestry Issues Presentation Team Activity	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3
CS.04.02. Performance Indicator: Assess the natural resource related trends, technologies and policies that impact AFNR systems.		
CS.04.02.01.b. Analyze natural resources trends and technologies and document how they impact AFNR systems (e.g., climate change, green technologies, water resources, etc.).	Forestry Issues Presentation Team Activity	AFNR Career Cluster, Statement 7
CS.05.01. Performance Indicator: Evaluate the steps and requirements to pursue a career opportunity in each of the AFNR career pathways (e.g., goals, degrees, certifications, resumes, cover letter, portfolios, interviews, etc.).		
CS.05.01.01.a. Identify and summarize the steps to pursue a career in an AFNR pathway (e.g., self-assessment, set goals, etc.).	Exam	

Agriculture, Food and Natural Resources Content Standards continued

Measurement Assessed	Where measured in event	Academic Content Standards Addressed
CS.05.01.02.a. Examine the educational, training and experiential requirements to pursue a career in an AFNR pathway (e.g., degrees, certifications, training, internships, etc.).	Entire event	
CS.05.01.03.a. Research and summarize specific tools (e.g., resumes, portfolios, cover letters, etc.) and processes (e.g., interviews, applications, etc.) needed to pursue a career in an AFNR pathway.	Entire event	
CS.06.01. Performance Indicator: Explain foundational cycles and systems of AFNR.		
CS.06.01.01.b. Analyze how foundational cycles affect production, processing and management of food, fiber and fuel.	Exam	
ESS.01.01. Performance Indicator: Analyze and interpret laboratory and field samples in environmental service systems.		
ESS.01.01.01.c. Collect and prepare sample measurements using appropriate data collection techniques.	Tree Measurement— Timber Cruising for Board Volume Compass Practicum	CCSS.ELA-LITERACY.SL.11-12.5 CCSS.ELA-LITERACY.RST.11-12.9 CCSS.MATH.CONTENT.HSN.Q.A.1 CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3 CCSS.MATH.CONTENT.HSS.ID.A.2 CCSS.MATH.CONTENT.HSS.ID.B.5 HS-ESS2-2
ESS.01.01.02.c. Utilize data analysis to identify trends in a data sample and assess the confidence that can be drawn from those conclusions.	Forest Business Management Problem Practicum	CCSS.ELA-LITERACY.SL.11-12.5 CCSS.ELA-LITERACY.RST.11-12.9 CCSS.MATH.CONTENT.HSN.Q.A.1 CCSS.MATH.CONTENT.HSN.Q.A.2 CCSS.MATH.CONTENT.HSN.Q.A.3 CCSS.MATH.CONTENT.HSS.ID.A.2 CCSS.MATH.CONTENT.HSS.ID.B.5 HS-ESS2-2
ESS.01.02. Performance Indicator: Properly utilize scientific instruments in environmental monitoring situations (e.g., laboratory equipment, environmental monitoring instruments, etc.).		
ESS.01.02.01.a. Identify basic laboratory equipment and explain their uses.	Equipment Identification Practicum	
ESS.01.02.02.a. Identify basic environmental monitoring instruments and explain their uses.	Equipment Identification Practicum	
ESS.05.01. Performance Indicator: Use technological and mathematical tools to map land, facilities and infrastructure for environmental service systems.		
ESS.05.01.01.c. Demonstrate surveying and cartographic skills to make site measurements in order to address concerns and needs within an environmental service systems situation.	Map Interpretation Practicum Compass Practicum	HS-ETS1-4

Agriculture, Food and Natural Resources Content Standards continued

Measurement Assessed	Where measured in event	Academic Content Standards Addressed
NRS.01.01. Performance Indicator: Apply methods of classification to examine natural resource availability and ecosystem function in a particular region.		
NRS.01.01.01.c. Devise strategies for the preservation of natural resources based on their classification.	Forest Business Management Problem Practicum	AFNR Career Cluster, Statement 1 AFNR Career Cluster, Statement 2 AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3 STEM Career Cluster, Statement 1 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9
NRS.01.02. Performance Indicator: Classify different types of natural resources in order to enable protection, conservation, enhancement and management in a particular geographical region.		
NRS.01.02.01.b. Apply identification techniques to determine the species of a tree or woody plant.	Tree Identification Tree/Forest Disorders Practicum	AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.7 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.MATH.CONTENT.HSN-Q.A.1 CCSS.MATH.CONTENT.HSN-Q.A.2 HS-ESS3-2
NRS.01.02.01.c. Evaluate the species of trees present to assess the health of an ecosystem (e.g., presence of native versus invasive species, biodiversity, etc.).	Forestry Issues Presentation Team Activity	AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.7 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.MATH.CONTENT.HSN-Q.A.1 CCSS.MATH.CONTENT.HSN-Q.A.2 HS-ESS3-2

Agriculture, Food and Natural Resources Content Standards continued

Measurement Assessed	Where measured in event	Academic Content Standards Addressed
NRS.01.02.02.b. Apply identification techniques to determine the species of an herbaceous plant.	Tree/Forest Disorders Practicum	AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.7 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.MATH.CONTENT.HSN-Q.A.1 CCSS.MATH.CONTENT.HSN-Q.A.2 HS-ESS3-2
NRS.01.02.03.b. Apply identification techniques to determine the species of wildlife or insect.	Tree/Forest Disorders Practicum	AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.7 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.MATH.CONTENT.HSN-Q.A.1 CCSS.MATH.CONTENT.HSN-Q.A.2 HS-ESS3-2
NRS.01.02.06.c. Conduct an assessment of the resource inventories or population in a given area.	Forest Business Management Problem Practicum Tree Measurement— Timber Cruising for Board Volume	AFNR Career Cluster - Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.7 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.MATH.CONTENT.HSN-Q.A.1 CCSS.MATH.CONTENT.HSN-Q.A.2 HS-ESS3-2

Agriculture, Food and Natural Resources Content Standards continued

Measurement Assessed	Where measured in event	Academic Content Standards Addressed
NRS.01.05. Performance Indicator: Apply ecological concepts and principles to terrestrial natural resource systems.		
NRS.01.05.01.b. Analyze and summarize examples of stages of succession.	Exam	AFNR Career Cluster, Statement 1 AFNR Career Cluster – Animal Systems Pathway, Statement 3 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.MATH.CONTENT.HSS-ID.A.1 CCSS.MATH.CONTENT.HSS-IC.A.1 CCSS.MATH.CONTENT.HSS-IC.B.6 HS-ESS3-4 HS-ESS3-2
NRS.01.05.03.c. Devise a forest management plan that improves the habitat while sustainably maximizing the amount of timber that can be harvested.	Forest Business Management Problem Practicum	AFNR Career Cluster, Statement 1 AFNR Career Cluster – Animal Systems Pathway, Statement 3 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.MATH.CONTENT.HSS-ID.A.1 CCSS.MATH.CONTENT.HSS-IC.A.1 CCSS.MATH.CONTENT.HSS-IC.B.6 HS-ESS3-4 HS-ESS3-2
NRS.01.06. Performance Indicator: Apply ecological concepts and principles to living organisms in natural resource systems.		
NRS.01.06.02.b. Analyze factors that influence the establishment and spread of invasive species and determine the appropriate steps to prevent or minimize the impact of invasive species.	Forestry Issues Presentation Team Activity	AFNR Career Cluster, Statement 1 AFNR Career Cluster – Animal Systems Pathway, Statement 3 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.2 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.9-10.5 CCSS.ELA-LITERACY.WHST.11-12.5 CCSS.ELA-LITERACY.WHST.9-10.7 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.9-10.9 CCSS.ELA-LITERACY.WHST.11-12.9 HS-LS4-4 HS-LS4-6 HS-ESS3-4

Agriculture, Food and Natural Resources Content Standards continued

Measurement Assessed	Where measured in event	Academic Content Standards Addressed
NRS.02.04. Performance Indicator: Examine and explain how economics affects the use of natural resources.		
NRS.02.04.01.a. Compare and contrast how the economic value of a natural resource affects its availability.	Forestry Issues Presentation Team Activity	AFNR Career Cluster, Statement 4 AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 4 AFNR Career Cluster – Plant Systems Pathway, Statement 1 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.8 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.ELA-LITERACY.SL.11-12.4 HS-ESS3-2
NRS.02.04.02.b. Assess the importance of the use of natural resources on local, state and national economies.	Forestry Issues Presentation Team Activity	AFNR Career Cluster, Statement 4 AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 4 AFNR Career Cluster – Plant Systems Pathway, Statement 1 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.8 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.ELA-LITERACY.SL.11-12.4 HS-ESS3-2
NRS.02.04.03.a. Compare and contrast the economic impact of green technology and alternative energy.	Forestry Issues Presentation Team Activity	AFNR Career Cluster, Statement 4 AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 4 AFNR Career Cluster – Plant Systems Pathway, Statement 1 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.8 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.ELA-LITERACY.SL.11-12.4 HS-ESS3-2

Agriculture, Food and Natural Resources Content Standards continued

Measurement Assessed	Where measured in event	Academic Content Standards Addressed
NRS.02.04.03.b. Analyze and document how the adoption of green technology and/or alternative energy affected a local, state or national economy.	Forestry Issues Presentation Team Activity	AFNR Career Cluster, Statement 4 AFNR Career Cluster – Agribusiness Systems Pathway, Statement 4 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 4 AFNR Career Cluster – Plant Systems Pathway, Statement 1 CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.8 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.ELA-LITERACY.SL.11-12.4 HS-ESS3-2
NRS.02.05. Performance Indicator: Communicate information to the public regarding topics related to the management, protection, enhancement, and improvement of natural resources.		
NRS.02.05.02.a. Research how social media and the Internet have changed how people perceive and utilize natural resources (e.g., greater awareness of conservation issues, calls to action, etc.).	Forestry Issues Presentation Team Activity	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3
NRS.02.05.03.a. Examine how communication can be used to influence behavior, call people to action and instill a sense of civic behavior related to the conservation, management, enhancement and improvement of natural resources.	Forestry Issues Presentation Team Activity	AFNR Career Cluster, Statement 2 AFNR Career Cluster, Statement 3 STEM Career Cluster, Statement 2 STEM Career Cluster, Statement 3
NRS.03.01. Performance Indicator: Sustainably produce, harvest, process and use natural resource products (e.g., forest products, wildlife, minerals, fossil fuels, shale oil, alternative energy, recreation, aquatic species, etc.).		
NRS.03.01.01.c. Develop a forest harvesting plan that ensures economic, environmental and social sustainability.	Forest Business Management Problem Practicum	AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1 AFNR Career Cluster – Plant Systems Pathway, Statement 4 CCSS.ELA-LITERACY.RST.11-12.8 HS-ESS3-2 HS-ESS3-3
NRS.03.01.07.a. Research how recreational uses of natural resources can be changed to improve sustainability.	Forestry Issues Presentation Team Activity	AFNR Career Cluster – Food Products and Processing Systems Pathway, Statement 1 AFNR Career Cluster – Plant Systems Pathway, Statement 4 CCSS.ELA-LITERACY.RST.11-12.8 HS-ESS3-2 HS-ESS3-3

Agriculture, Food and Natural Resources Content Standards continued

Measurement Assessed	Where measured in event	Academic Content Standards Addressed
NRS.03.02. Performance Indicator: Demonstrate cartographic skills, tools and technologies to aid in developing, implementing and evaluating natural resource management plans.		
NRS.03.02.01.a. Summarize how to use maps to identify directions and land features, calculate actual distance and determine the elevations of points.	Map Interpretation Practicum	
NRS.04.01. Performance Indicator: Demonstrate natural resource protection, maintenance, enhancement and improvement techniques.		
NRS.04.01.02.c. Create a timber stand improvement plan for a forest.	Forest Business Management Problem Practicum	AFNR Career Cluster – Environmental Service Systems Pathway, Statement 3 AFNR Career Cluster – Environmental Service Systems Pathway, Statement 4 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 2 AFNR Career Cluster – Natural Resources Systems Pathway, Statement 5 AFNR Career Cluster – Plant Systems Pathway, Statement 2 AFNR Career Cluster – Plant Systems Pathway, Statement 3 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.SL.11-12.4 HS-ESS3-2 HS-ESS3-3 HS-ESS3-4
NRS.04.02. Performance Indicator: Diagnose plant and wildlife diseases and follow protocols to prevent their spread.		
NRS.04.02.01.a. Classify causes of diseases in plants and the correct authorities to whom some diseases should be reported.	Tree/Forest Disorders Practicum	CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.11-12.2 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.ELA-LITERACY.WHST.11-12.8 CCSS.ELA-LITERACY.WHST.11-12.9 CCSS.MATH.CONTENT.HSN-Q.A.1 CCSS.MATH.CONTENT.HSN-Q.A.2 CCSS.MATH.CONTENT.HSN-Q.A.3 HS-LS2-7

Agriculture, Food and Natural Resources Content Standards continued

Measurement Assessed	Where measured in event	Academic Content Standards Addressed
NRS.04.03. Performance Indicator: Prevent or manage introduction of ecologically harmful species in a particular region.		
NRS.04.03.01.a. Categorize harmful and beneficial insects, as well as signs of insect damage to natural resources.	Tree/Forest Disorders Practicum	CCSS.ELA-LITERACY.RST.11-12.1 CCSS.ELA-LITERACY.RST.11-12.7 CCSS.ELA-LITERACY.RST.11-12.8 CCSS.ELA-LITERACY.WHST.9-10.5 CCSS.ELA-LITERACY.WHST.11-12.5 CCSS.ELA-LITERACY.WHST.9-10.7 CCSS.ELA-LITERACY.WHST.11-12.7 CCSS.MATH.CONTENT.HSN-Q.A.1 CCSS.MATH.CONTENT.HSN-Q.A.2 CCSS.MATH.CONTENT.HSN-Q.A.3 CCSS.MATH.CONTENT.HSS-ID.A.1 CCSS.MATH.CONTENT.HSS-IC.A.1 CCSS.MATH.CONTENT.HSS-IC.B.6 HS-LS2-7 HS-LS4-6
NRS.04.04. Performance Indicator: Manage fires in natural resource systems.		
NRS.04.04.01.b. Assess techniques used to fight wildfires, manage prescribed fires and ensure human safety.	Exam	
PS.02.02. Performance Indicator: Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems.		
PS.02.02.03.a. Identify and summarize the components and the functions of plant stems. Knowledge	Exam	HS-LS1-4
PS.02.02.04.a. Research and summarize leaf morphology and the functions of leaves.	Exam	HS-LS1-4
PS.03.03. Performance Indicator: Develop and implement a plan for integrated pest management for plant production.		
PS.03.03.01.b. Identify and analyze major local weeds, insect pests and infectious and noninfectious plant diseases.	Tree/Forest Disorders Practicum	
PST.01.01. Performance Indicator: Apply physical science and engineering principles to assess and select energy sources for AFNR power, structural and technical systems.		
PST.01.01.01.a. Research and identify renewable and nonrenewable energy sources used in AFNR.	Forestry Issues Presentation Team Activity	AFNR Career Cluster, Statement 4 AFNR Career Cluster, Statement 5 HS-ESS3-3 HS-PS3-3
PST.01.02. Performance Indicator: Apply physical science and engineering principles to design, implement and improve safe and efficient mechanical systems in AFNR situations.		
PST.01.02.03.c. Conduct a safety inspection of tools, machines and equipment used in different AFNR related mechanical systems.	Chainsaw Part Identification,	HS-PS3-1 HS-PS3-3